

October 1999

SUPERFUND

Information on the Program's Funding and Status



**Resources, Community, and
Economic Development Division**

B-283841

October 29, 1999

The Honorable Trent Lott
Majority Leader
United States SenateThe Honorable Robert Smith
Chairman, Subcommittee on Superfund,
Waste Control, and Risk Assessment
Committee on Environment and
Public Works
United States Senate

Nearly 20 years after the establishment of the Superfund program and total expenditures of over \$14 billion for cleanups, about 42 percent of the approximately 1,400 hazardous waste sites that the Environmental Protection Agency (EPA) has designated as national priorities for environmental cleanup do not have completed cleanup remedies. The sites that EPA has placed on its list of severely contaminated sites, the National Priorities List, are located on both federal and nonfederal property. As of April 1999, 838 sites still required cleanup actions; 640 of these were nonfederal sites. The pace and cost of this cleanup effort have been the subjects of long-standing congressional debate.

Cleanup actions fall into two broad categories: removal actions and remedial actions. Remedial actions usually take longer, cost more, and are designed to provide a permanent remedy. These actions progress through several steps that can be grouped in three phases: the remedial investigation and feasibility study phase, the remedial design phase, and the remedial action phase. Together, these phases have historically taken 10 or more years to complete and often cost millions of dollars. Half of these sites also require a fourth phase—operation and maintenance—for long-term cleanups of groundwater or surface water. This phase can take over 30 years. Removal actions are usually shorter-term cleanups for sites that pose immediate threats to human health or the environment. EPA has the authority to require the parties responsible for a site's contamination to pay for its cleanup. These responsible parties may include, among others, the site's current and former owners and parties that transported waste to the site. Responsible parties incur legal costs, called "transaction costs," to allocate the cleanup expenses among themselves, to settle with the government, and to litigate liability for cleanups. EPA may also pay for

site cleanups using funds from the Hazardous Substance Superfund (commonly referred to as the Superfund trust fund).

The Superfund trust fund, which has also financed among other things, the Superfund program's administrative expenses, has been financed primarily by a tax on crude oil and certain chemicals, together with an environmental tax on corporations. Although the authority for these taxes expired in December 1995, some taxes continued to be received into the trust fund because of private-sector arrears and corrections made by the U.S. Treasury when adjusting allocations made to various federal trust funds. The trust fund also continues to receive revenue from interest accrued on the unexpended invested balance, recoveries of cleanup costs from responsible parties, and collections of fines and penalties. Since 1995, the program has been funded primarily from the trust fund's remaining balances, supplemented by appropriations from general revenues (i.e., from Treasury's General Fund). Superfund moneys may be appropriated, transferred, or allocated to other federal agencies to accomplish Superfund activities. In addition, EPA relies heavily on contracts and assistance agreements to accomplish Superfund work. When EPA awards a contract or enters into an assistance agreement, it obligates federal funds to cover the cost of the planned work. In some instances, obligated but unspent Superfund moneys may be deobligated and used for other Superfund activities because congressional appropriations for the Superfund program remain available for use until expended.

Because of your interest and the interest of the late Senator John Chafee, Chairman, Senate Committee on Environment and Public Works, in the financial status of the Superfund program and the status and cost of cleanups at the 640 nonfederal sites already on the National Priorities List, you asked us to provide information on (1) the status of the program's funding and expenditures, including information on the Superfund trust fund to date and the moneys appropriated from it to federal agencies other than EPA for Superfund activities; (2) the costs to responsible parties for all site cleanups and these parties' related transaction costs from 1980 through 1998, categorized before and after December 1995, when the authority for Superfund taxes expired; and (3) the cleanup status of the 640 nonfederal sites, as of April 1999, and the estimated total and annual costs to complete cleanups of these sites.

Results in Brief

- Taxes paid into the Superfund trust fund totaled about \$13.5 billion from 1981 through 1998, and the unappropriated balance in the Superfund trust fund we estimated to be \$1.4 billion at the end of fiscal year 1999. A total of \$940 million in program funds was also deobligated for use on other Superfund projects for fiscal years 1994 through 1999, but this total is not included in the unappropriated trust fund balance. Expenditures from the trust fund totaled \$14.7 billion from fiscal year 1987 through fiscal year 1998, the most recent year for which these data are available. From 1996 through 1998, approximately 45 percent of all expenditures were for contractor cleanup costs; 17 percent were for on site-specific cleanup support costs, such as supervising cleanup contractors; and 38 percent were for non-site-specific cleanup support costs, such as financial management and policy development activities. During fiscal years 1995 through 1998, about 10 percent of the funds appropriated annually for the Superfund program were appropriated from the trust fund, transferred or allocated to federal agencies other than EPA. For example, the Department of Justice receives funds to provide EPA with enforcement assistance.
- From 1980 through 1998, responsible parties' total costs for cleanup activities at sites on the National Priorities list was an estimated \$15.5 billion. About 17 percent of these costs occurred after the authority for Superfund taxes expired in December 1995. The total estimated transaction costs from 1980 through 1998 incurred by responsible parties ranged from \$3.2 billion to \$7.6 billion, according to several studies of these costs.
- Of the 640 nonfederal sites on the National Priorities List, 376 were in the remedial investigation and feasibility study phase, 133 were in the remedial design phase, and 131 were in the remedial action phase, as of mid-April 1999. We estimate, on the basis of EPA's projections for some sites¹ and actual experience at others, that cleanups will be completed at 85 percent of the sites by the end of calendar year 2008. The remainder will not be completed until well after 2008. We estimate that, in total, it will cost between \$8.2 billion and \$11.7 billion more than already expended to clean up the 640 nonfederal sites. Our estimate is based on EPA's estimated cleanup costs and includes contractor cleanup costs, site-specific support costs, non-site-specific support costs, and operation and maintenance costs, including costs to maintain long-term remedies, such as pumping and treating groundwater. We also estimate that if EPA is

¹See Superfund: Half the Sites Have All Cleanup Remedies in Place or Completed (GAO/RCED-99-245, July 30, 1999).

to finish cleaning up 85 percent of the 640 sites by the end of fiscal year 2008, its costs will average \$875 million annually through 2008.

Background

In 1980, the Congress passed the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), creating the Superfund program to clean up highly contaminated hazardous waste sites. CERCLA requires EPA to develop and maintain a list of sites, known as the National Priorities List (NPL), that the agency considers the most hazardous to human health or the environment. Regulations for the program are set forth in the National Contingency Plan, which provides specific guidance concerning the selection and performance of cleanup remedies.

Under these regulations, sites undergoing remedial action progress through several stages in the cleanup process. In the remedial investigation stage, a site's contamination is assessed in terms of type, extent, and associated risks to human health or the environment. A feasibility study is done concurrently with the remedial investigation and focuses on the development and analysis of cleanup alternatives for the site. A preferred remedy is then set forth in a proposed plan that is released for public comment. After the public comments are considered, a record of decision (ROD) is prepared describing the site and the chosen remedy. Next, the site proceeds to the remedial design phase, where technical plans are prepared for the chosen remedy. Finally, the site enters the remedial action phase where construction work is performed as indicated in the remedial design. When the chosen remedy has been constructed and inspected by EPA, the agency considers the site to be "construction complete." At this point some sites proceed to an operation and maintenance stage, where additional measures are taken to maintain the implemented remedy.

Status of the Superfund Program's Funding and Expenditures

Funding for the Superfund program is derived from taxes and other revenues deposited in the Superfund trust fund and appropriations made available from general revenues. In total about \$13.5 billion in taxes was collected from 1981 through 1998. Although the authority for these taxes expired in December 1995, some taxes continue to be received into the trust fund because of private-sector arrears and corrections made by the U.S. Treasury when adjusting allocations made to various federal trust funds. The trust fund also continues to receive revenue from interest accrued on the unexpended invested balance, recoveries of cleanup costs

from responsible parties, and collections of fines and penalties. Table 1 summarizes the Superfund taxes, by category and year.

Table 1: Taxes Paid Into the Superfund Trust Fund, by Category, Fiscal Years 1981-98

Dollars in millions

Tax	Fiscal year								
	1981	1982	1983	1984	1985	1986	1987	1988	1989
Crude and petroleum	\$21	\$40	\$35	\$38	\$41	\$2	\$419	\$503	\$595
Certain chemicals	107	204	196	224	233	13	216	196	288
Corporate environmental	a	a	a	a	a	a	196	313	292
Annual total	\$128	\$244	\$230	\$261	\$273	\$15	\$831	\$1,011	\$1,175
Cumulative total	\$128	\$372	\$602	\$863	\$1,136	\$1,151	\$1,982	\$2,993	\$4,168

Dollars in millions

Tax	Fiscal year								
	1990	1991	1992	1993	1994	1995	1996	1997	1998
Crude and petroleum	\$572	\$547	\$550	\$569	\$557	\$576	\$160	\$1	\$(3)
Certain chemicals	246	262	268	256	250	291	94	7	2
Corporate environmental	461	591	380	886	653	612	382	68	79
Annual total	\$1,279	\$1,401	\$1,197	\$1,711	\$1,459	\$1,479	\$636	\$76	\$79
Cumulative total	\$5,447	\$6,848	\$8,045	\$9,757	\$11,216	\$12,695	\$13,331	\$13,407	\$13,486

Note: The taxes paid from the three sources may not add to the totals shown because of rounding.

^aNot applicable.

Source: EPA's Budget Division.

The Superfund trust fund balance at the end of fiscal year 1999 is estimated to be about \$1.4 billion. This balance is available for appropriation in fiscal year 2000. EPA's audited financial statements for fiscal year 1998 show that, as of September 30, 1998, the trust fund had an unappropriated balance of \$2.06 billion.² For fiscal year 1999, the Congress made \$1.5 billion available to the Superfund program (\$1.2 billion from the trust fund and \$0.3 billion from general revenues), leaving \$0.9 billion available for future appropriations. The fund continues to receive revenue, primarily from interest on the unexpended balance and recoveries from responsible parties that have reimbursed EPA for its cleanup costs at hazardous waste sites. There is a lag between the appropriation of funds,

²EPA's Fiscal Year 1998 Financial Statement, EPA, Office of the Inspector General.

the obligation of funds, and the actual disbursement of funds. Until funds are actually disbursed, they remain in the trust fund earning interest. The total undisbursed balance in the trust fund as of July 31, 1999, was \$4.6 billion. We estimate that the trust fund will receive approximately \$0.6 billion in additional revenues during fiscal year 1999. See table 2.

Table 2: Unappropriated Superfund Trust Fund Balance Estimated for the End of Fiscal Year 1999

Unappropriated balance	Estimate for fiscal year 1999
Unappropriated balance at start of fiscal year	\$2,056,248,000
Appropriated from general revenues	325,000,000
Subtotal	\$2,381,248,000
Appropriated to Superfund program	(1,500,000,000)
Total unappropriated balance	\$881,248,000
Revenues	
Interest on unexpended balance	233,982,377 ^a
Recoveries	307,082,270 ^a
Fines and penalties	4,096,417 ^a
Tax revenues	18,866,431 ^a
Total revenues	\$564,027,495^a
Unappropriated balance at end of fiscal year	\$1,445,275,495

^aProjections based on actual Treasury data current as of July 31, 1999.

Source: GAO's analysis of data from Treasury and EPA.

For fiscal years 1994 through 1998, EPA deobligated \$772 million in Superfund moneys. For fiscal year 1999, we projected that EPA would deobligate another \$168 million, for a total of \$940 million, in fiscal years 1994 through 1999. Although deobligated funds do not affect the unappropriated balance of the trust fund, they do affect its unobligated balance and the amounts EPA can obligate in any particular year. EPA obligates appropriated Superfund moneys for contracts to clean up and oversee the cleanup of Superfund sites. If these contracts expire or are canceled and unexpended obligated funds remain, EPA is allowed to deobligate these funds and use them for other projects. EPA begins to identify Superfund moneys for deobligation early in each fiscal year so that it can use the moneys during the same fiscal year. We previously reported that EPA had opportunities to identify and recover additional Superfund moneys.³ Additionally, EPA's Office of Inspector General has

³See Environmental Protection: Funds Obligated for Completed Superfund Projects (GAO/RCED-98-232, July 21, 1998).

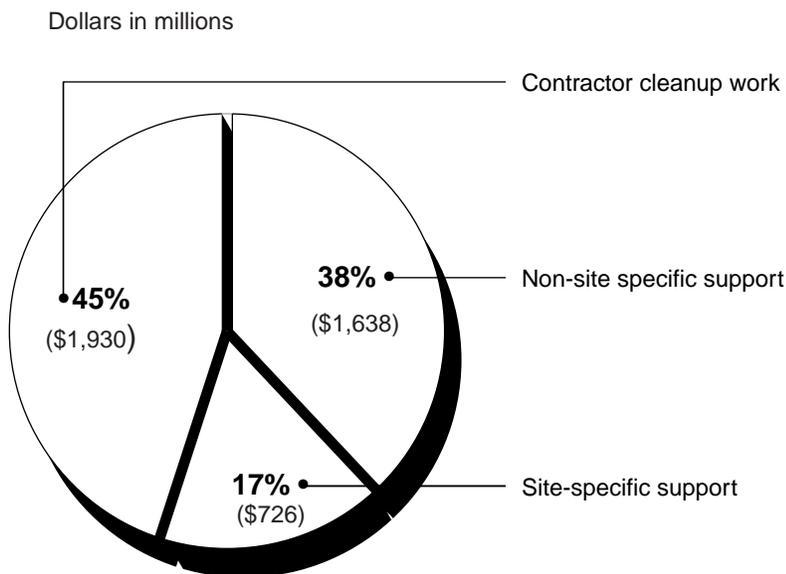
reported weaknesses in the deobligation process and found that overall improvements in EPA's deobligation process would result in additional funds being made available to the agency for environmental goals.⁴

For the 12-year period from fiscal year 1987 through fiscal year 1998, EPA's expenditures for the Superfund program totaled \$14.7 billion. Appendix I provides information on expenditures by year for this period. For fiscal years 1996 through 1998, the program's expenditures totaled \$4.3 billion, and data were readily available for allocating these expenditures among three general categories—contractor cleanup work, site-specific support, and non-site-specific support.⁵ For the years before fiscal year 1996, expenditure data could not readily be allocated among these three general categories. As figure 1 shows, 45 percent of the \$4.3 billion spent from fiscal year 1996 through fiscal year 1998 was for contractor cleanup work, 17 percent was for site-specific support costs, and 38 percent was for non-site-specific support costs.

⁴See Audit of EPA's Fiscal Year 1998 Financial Statements, EPA, Office of Inspector General, Report No. 99B0003 (Sept. 28, 1999).

⁵See Superfund: EPA Can Improve Its Monitoring of Superfund Expenditures (GAO/RCED-99-139, May 11, 1999).

Figure 1: Superfund Expenditures for Fiscal Years 1996-98, in Three Categories.



Source: GAO's analysis of data from EPA.

The total Superfund moneys appropriated, transferred, or allocated to other federal agencies ranged from 9 percent to 11 percent of the total Superfund appropriations for fiscal years 1995 through 1998. The Congress appropriates funding from the Superfund trust fund to federal agencies other than EPA for Superfund activities. EPA does not routinely track expenditures of Superfund moneys by these agencies; however, it does track appropriations and transfers of program funds to these other federal agencies. The other federal agencies with important Superfund responsibilities include the Department of Justice, which provides enforcement assistance; the National Institute of Environmental Health Sciences, which provides research on human health effects for individual chemicals and is a National Institute of Health within the Department of Health and Human Services; and the Agency for Toxic Substances and Disease Registry, which provides overall health assessments for individual Superfund sites and is within the Public Health Service of the U.S. Department of Health and Human Services. Table 3 displays the annual Superfund appropriations, transfers, or allocations for these agencies for fiscal years 1995 through 1998.

Table 3: Superfund Appropriations, Transfers, or Allocations to Federal Agencies Other Than EPA for Fiscal Years 1995-98

Dollars in millions				
Agency	Fiscal Year			
	1995	1996	1997	1998
Department of Justice (enforcement)	\$32.2	\$30.0	\$30.0	\$29.7
Other federal agencies				
Agency for Toxic Substances and Disease Registry	68.8	59.0	64.0	74.0
National Institute of Environmental Health Science	58.7	50.5	53.3	58.0
U.S. Coast Guard	4.8	4.4	4.8	4.8
National Oceanic and Atmospheric Administration	2.2	2.0	2.2	2.4
Federal Emergency Management Agency	0.9	1.1	1.1	1.1
Department of the Interior	0.6	0.7	0.9	0.9
Occupational Safety and Health Administration	0.3	0.3	0.5	0.7
Total, other federal agencies	\$136.3	\$118.0	\$127.0	\$141.9
Total	\$168.5	\$148.0	\$157.0	\$171.6

Source: EPA's Budget Office.

Responsible Parties' Cleanup and Transaction Costs

According to EPA's estimates, the costs of site cleanup for work performed by responsible parties totaled approximately \$15.5 billion from 1980, the year of CERCLA's enactment, through 1998. During this same period, EPA recovered about \$2.4 billion from responsible parties for cleanup work it performed, as shown in table 4. EPA principally relies on data collected from settlement agreements reached with responsible parties to estimate these recoveries. Because responsible parties are not required to publicly report the cleanup and related transaction costs they incur, the actual dollar amount that responsible parties have expended for site cleanups is unknown. EPA principally relies on standard cost assumptions or information contained in RODs to estimate the value of cleanup work

performed by responsible parties. Specifically, these are estimates of the value of the cleanup work to be performed over the life of the cleanup, which, in some cases, can take over 30 years to complete. As a result, the actual costs incurred by responsible parties may occur well after the ROD or settlement date. Additionally, the ROD estimates do not take into account cost growth that may occur between the selection of remedies and actual cleanups or, alternatively, cost savings that responsible parties may realize when conducting cleanups more efficiently than EPA had projected.

Table 4: Estimated Responsible Parties' Site Cleanup Costs, 1980-98

Dollars in millions

Time period	Responsible parties' estimated cleanup costs	EPA's costs recovered from responsible parties	Total
Before expiration of Superfund tax authority (1980-Dec. 1995)	\$11.1	\$1.7	\$12.8
After expiration of Superfund tax authority (Jan. 1996-Sept. 1998)	1.9	0.7	2.7
Total	\$13.0	\$2.4	\$15.5

Source: EPA's Office of Site Remediation Enforcement.

In addition to cleanup costs, responsible parties incur transaction costs, which include the legal expenses associated with cleanups, such as the costs incurred during negotiations or litigation with EPA, other responsible parties, or insurance companies. Although a number of independent studies have attempted to estimate transaction cost amounts, their respective results differ, in part because of differing methodologies. The transaction costs estimated in these studies ranged between 17 and 33 percent of responsible parties' total expenditures. In a 1995 testimony, the Congressional Budget Office (CBO), estimated that transaction costs could range between 17 and 20 percent of responsible parties' total expenditures.⁶ In 1994, the RAND Institute for Civil Justice estimated that responsible parties' transaction costs were approximately 32 percent of

⁶Statement of Jan Paul Acton, Assistant Director, Natural Resources and Commerce Division, Congressional Budget Office, on the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, before the Subcommittee on Water Resources and Environment, Committee on Transportation and Infrastructure, U.S. House of Representatives, June 22, 1995, p. 9.

total expenditures.⁷ Also in 1994, we estimated that transaction costs could account for about 33 percent of responsible parties' total expenditures at NPL sites.⁸ These estimates, however, could change depending on, among other things, EPA's actions or future Superfund legislation. Specifically, the estimates were conducted before EPA initiated reforms to the Superfund program that were intended to facilitate settlements with responsible parties and reduce transaction costs.

Using these estimates and the responsible parties' cleanup costs presented in table 4, we estimate that responsible parties incurred \$3 billion to \$8 billion in transaction costs from 1980 through 1998, as shown in table 5. These estimates are calculated as percentages of total cleanup costs, including both cleanup costs and transaction costs. Responsible parties' costs before the authority for Superfund taxes expired in 1995 are estimated to range between \$15 billion and \$19 billion for the period 1980 through 1995. After the authority for Superfund taxes expired, the costs range between \$3 billion and \$4 billion for the period 1996 through 1998. Responsible parties' total estimated costs at NPL sites from 1980 to 1998 (for both cleanup costs and transaction costs) are estimated to range between \$19 billion and \$23 billion.

Table 5: Estimated Transaction Costs as a Percentage of Total Cleanup Costs

Time period	Author of study/study's estimated percentage			
	CBO		RAND	GAO
	17%	20%	32%	33%
Before expiration of Superfund tax authority (1980-Dec. 1995)	\$2.6	\$3.2	\$6.0	\$6.3
After expiration of Superfund tax authority (Jan. 1996-Sept. 1998)	0.6	0.7	1.3	1.3
Total	\$3.2	\$3.9	\$7.3	\$7.6

Source: GAO's analysis of data from EPA.

⁷Lloyd S. Dixon, *Fixing Superfund: The Effect of the Proposed Superfund Reform Act of 1994 on Transaction Costs* (Santa Monica, California: RAND, 1994), p.xvi.

⁸See *Superfund: Legal Expenses for Cleanup-Related Activities of Major U.S. Corporations* (GAO/RCED-95-46, Dec. 23, 1994).

Status of and Cost to Complete Cleanups of 640 Nonfederal Sites

As of mid-April 1999, EPA had 640 nonfederal NPL sites where the construction of a cleanup remedy, such as a removal of contaminated soil, had not been completed. Of these sites, 59 percent, or 376, were in the remedial investigation and feasibility study phase; 21 percent, or 133, were in the design phase; and 20 percent, or 131, were in the remedial action phase. In each phase, the work may be planned, ongoing, or completed. As shown in table 6, at the 376 sites in the remedial investigation and feasibility study phase, the work is planned for 54, ongoing for 238, and completed for 84. Each site consists of one or more operable units that correspond to different areas within the site or different environmental media, such as soil and groundwater. At the 8 sites shown as completed in the remedial action phase, all operable units had been completed, but EPA had not yet finished all steps required to designate the sites as “construction complete.” We classified each site’s progress by the operable unit in the least advanced phase of the Superfund process. The 640 nonfederal sites included a total 1,279 operable units.

Table 6: Status of Sites Based on the Least Advanced Operable Units, as of Mid-April 1999

Cleanup phase	Status of work in phase			Total sites
	Planned	Ongoing	Completed	
Remedial investigation and feasibility study	54	238	84	376
Remedial design	^a	107	26	133
Remedial action	^a	123	8	131
Total sites	54	468	118	640

^aSites completing an earlier cleanup phase will move to this phase.

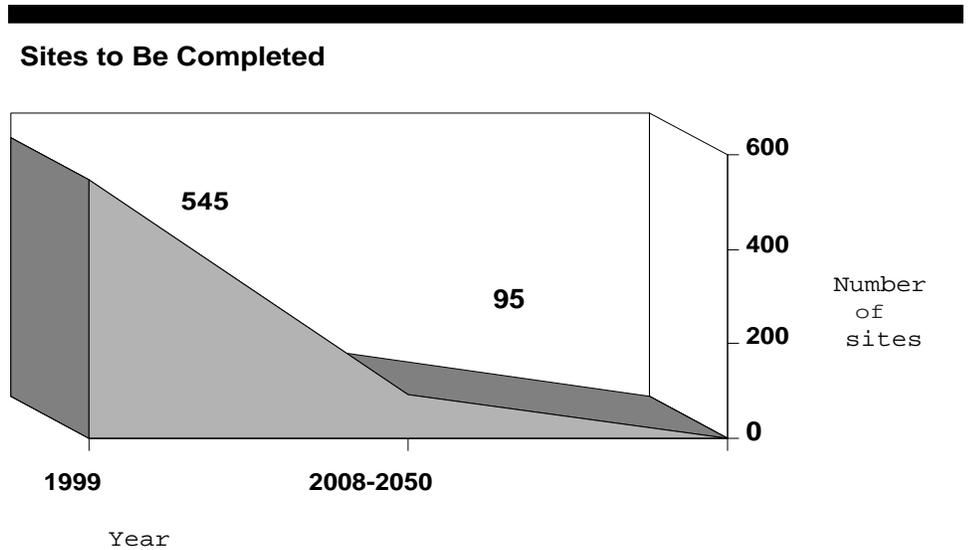
Source: EPA.

In contrast, if a site’s progress is based on the operable unit in the most advanced stage of the Superfund process, then 33 percent, or 212 sites, were in the remedial investigation and feasibility study phase; 18 percent, or 112 sites, were in the design phase; and 49 percent, or 316 sites, were in the remedial action phase.

On the basis of EPA’s schedule for completing work at 364 sites and our application of EPA’s average estimated cleanup completion times as of April 1999 for the remaining 276 sites, we estimate that 85 percent, or 545, of the 640 sites will be cleaned up from April 1999 through calendar year 2008. EPA estimates that the average time to complete a site’s cleanup is 8

years.⁹ The agency emphasizes, however, that this is an average cleanup time, with some sites taking less time and others taking more. In addition, although the average includes any waiting time between cleanup phases, future average cleanup times could be different, depending on the complexity of the sites and EPA's budget constraints. EPA also believes that completing construction at some of the remaining 15 percent of sites may take well beyond 2008, as indicated in figure 2.

Figure 2: GAO's Estimate of Site Completions, by Year



Source: GAO's analysis of data from EPA and estimates from site managers.

We estimated that the total cost to complete cleanups at the 640 sites ranges from \$8.2 billion to \$11.7 billion, with a midpoint cost of \$9.9 billion. The midpoint cost is calculated and used to present the middle value in the range and to illustrate annual costs. The total cleanup cost includes support costs and operation and maintenance costs, as indicated in table 7.

⁹For this report, we used EPA's estimate of the average time to complete each cleanup phase—3.1 years for the remedial investigation/feasibility study, 2.8 years for the remedial design, and 2.1 years for the remedial action, for a total cleanup time of 8.0 years. We also used Superfund: Half the Sites Have Cleanup Remedies in Place and Completed (GAO/RCED-99-245, July 30, 1999). In 1997, we reported that the average cleanup time for nonfederal sites was 10.6 years. See Superfund: Times to Complete the Assessment and Cleanup of Hazardous Waste Sites (GAO/RCED-97-20, Mar. 31, 1997). EPA testified in Mar. 1999 before the Subcommittee on Finance and Hazardous Materials, Committee on Commerce, that the pace of cleanups had accelerated significantly in fiscal years 1997 and 1998.

Table 7: Estimated Total Costs Needed by EPA to Complete Cleanups at the 640 Sites

Dollars in millions			
Type of cost	Estimated total cleanup and support costs for 640 sites		
	High end of range	Low end of range	Midpoint
Contractor cleanup	\$3,111.0	\$4,680.3	\$3,895.6
Site-specific support ^a	1,169.7	1,759.8	1,464.7
Subtotal	\$4,280.7	\$6,440.1	\$5,360.3
Non-site-specific support ^b	2,641.2	3,973.6	3,307.4
Subtotal	\$6,922.0	\$10,413.7	\$8,667.7
Additional operation and maintenance ^c	1,280.0	1,280.0	1,280.0
Total	\$8,202.0	\$11,693.7	\$9,947.7

^aEstimated by multiplying contractor cleanup costs by 0.376. This multiplier is based on total Superfund support expenditures for fiscal years 1996-98.

^bEstimated by multiplying contractor cleanup costs by 0.849. This multiplier is based on total Superfund support expenditures for fiscal years 1996-98.

^cCalculated for operable units currently on the NPL that are not construction complete and are projected to be funded by EPA.

Source: GAO's analysis of EPA data.

We calculated that the estimated contractor cleanup costs for the 640 sites would range from a low of \$3.1 billion to a high of \$4.7 billion, with a midpoint cost of \$3.9 billion. When site-specific support costs are added, this estimate becomes \$4.3 billion to \$6.4 billion, with a midpoint cost of \$5.4 billion. Site-specific support costs include site analysis studies and EPA's costs to oversee cleanups led by responsible parties. Adding non-site-specific support costs results in estimates of \$6.9 billion to \$10.4 billion, with a midpoint cost of \$8.7 billion. Non-site-specific support costs include EPA's financial management and policy analysis costs. Finally, adding operation and maintenance costs brings the range for total costs from \$8.2 billion to \$11.7 billion, with a midpoint cost of \$9.9 billion. Operation and maintenance costs include EPA's costs to operate and maintain cleanup remedies after they have been constructed. A remedy to pump and treat groundwater, for example, can take 30 years or longer. At sites where EPA conducts the cleanup, the agency assumes responsibility for remedies designed to restore groundwater or surface water for up to the first 10 years; afterwards, the state is responsible for operating and maintaining the cleanup remedy. Appendix II provides a summary of our assumptions in preparing these cost estimates.

We estimated that the annual costs for cleaning up these 640 sites would range from about \$827 million to \$923 million per year through 2008—an average of \$875 million annually. Annual costs are presented by cost category (contractor support, site-specific and non-site-specific support costs, and operation and maintenance) in appendix III.

These annual cost estimates assume that 85 percent of the 640 sites will be cleaned up by 2008. After 2008, the total cost for the remaining 15 percent is \$1.6 billion, but the time required to complete cleanups at these sites is difficult to project. Our July 1999 report on the completion of cleanup remedies indicated that EPA remedial managers projected completion dates extending to 2050. Although we allocated the costs for these cleanups to 2009 and 2010, the costs may extend beyond 2010.

Agency Comments and Our Evaluation

We provided a copy of a draft of this report to EPA for its review and comment. EPA's comments are presented in appendix IV. EPA disagreed with our characterization of the Superfund program's costs and future funding needs and with our presentation of the status of the program's accomplishments. Specifically, EPA believes that our draft report greatly understates both. For example, according to EPA, our draft report neglects to consider the hundreds of millions of dollars required annually to protect communities from threats posed by sites not currently on the NPL, the cost of sites that will be placed on the NPL in the future, and what full funding for the Superfund program should be. As we state in our objectives, our report does not address the issues EPA raises. It presents information on the financial status of the Superfund program—in particular, the cost of completing the cleanup of the 640 nonfederal sites already on the NPL. EPA also stated that the draft report misrepresents the status of the Superfund program's accomplishments as indicated by EPA's progress in cleaning up sites to date. EPA believes that it has made more significant strides to complete work at current NPL sites than our draft report suggested. We revised our draft report to clarify the percentage of sites where the cleanup was not completed. EPA further stated that our draft report primarily describes the status of cleanups at Superfund sites by the least advanced operable unit and that these data do not describe the full progress that the agency has made at these sites. This assertion is not correct. Our draft report presents the progress of site cleanups by both the least advanced and the most advanced operable unit.

EPA also stated that we did not account for resources allocated to some of its offices, such as its Office of Inspector General and Office of Research

and Development, as well as resources transferred to certain other federal agencies that carry out some of the Superfund program's responsibilities, including the Agency for Toxic Substances and Disease Registry and other agencies. We disagree. This information appears in our discussion on the status of the program's funding and includes the amounts of funds appropriated, transferred, and allocated to these other agencies from fiscal year 1995 through fiscal year 1998. While our draft report does not provide data on the funds appropriated to EPA's Office of Inspector General, we believe the overall impact of this exclusion is insignificant because these funding amounts are relatively small. The funds transferred to several other federal agencies are also included in the overhead cost estimates that we present for the 640 nonfederal sites.

EPA also asserted that our draft report mischaracterizes the Superfund program's activities and expenditures by categorizing them as contractor cleanup costs, site-specific support costs, and non-site-specific support costs. EPA states that these categories are overly broad and have limited use in evaluating and managing the program. Moreover, according to EPA, using generic terms such as overhead fails to recognize the actual work that takes place to accomplish the cleanups that are the mandate of the Superfund program. We used these categories in a prior report on Superfund expenditures and believe that our categories are appropriate for defining the program's expenditures and accurately indicating how funds are spent for cleanups.

EPA also stated that our draft report inaccurately characterized responsible parties' expenditures for cleanup work. It said our estimate of these costs represented the parties' commitments for future cleanup work rather than expenditures to date. We revised the report to clarify this point.

We conducted our review from June 1999 through November 1999 in accordance with generally accepted government auditing standards. Our scope and methodology are presented in appendix V.

As arranged with your offices, unless you publicly announce its contents earlier, we plan no further distribution of this report until 30 days after the date of this letter. At that time, we will send copies of the report to other congressional committees; the Honorable Carol M. Browner, Administrator, EPA; the Honorable Jacob Lew, Director, Office of Management and Budget; and other interested parties. We will also make copies available to others on request.

Should you need further information, please call me (202) 512-6111. Key contributors to this report are included in appendix VI.

David G. Wood

David G. Wood
Associate Director, Environmental
Protection Issues

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Abbreviations

CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CBO	Congressional Budget Office
EPA	Environmental Protection Agency
GAO	General Accounting Office
NPL	National Priorities List
O&M	operation and maintenance
OU	operable unit
RA	remedial action
RD	remedial design
RI/FS	remedial investigation/feasibility study
ROD	record of decision

Superfund Expenditures for Fiscal Years 1987-98

Dollars in millions

Fiscal year	Total expenditures
1987	\$529.9
1988	790.3
1989	948.9
1990	1,127.0
1991	1,365.7
1992	1,367.4
1993	1,334.4
1994	1,449.7
1995	1,475.2
1996	1,411.7
1997	1,450.8
1998	1,403.1
Total	\$14,654.1

Cost Assumptions

We made the following assumptions and took the following steps to calculate the cost of completing cleanups at 640 nonfederal sites on the National Priorities List (NPL).

- We calculated the cost of completing cleanups of 1,279 operable units (OU) at the 640 nonfederal sites that the Environmental Protection Agency (EPA) had not designated as “construction complete” as of mid-April 1999.¹⁰ We did not include sites placed on the NPL after this time.
- Each OU was classified by EPA by cleanup phase—remedial investigation/feasibility study (RI/FS), remedial design (RD), or remedial action (RA)—and by status—planned, ongoing, or completed.
- Next, we determined what proportion of the OUS’ cleanups would be funded by EPA. For OUS in the RI/FS phase (planned, ongoing and completed) we assumed, on the basis of interviews with EPA officials and our reviews of EPA documents, that 55 percent would be funded by EPA.
- Using EPA’s data for ongoing and completed cleanups of OUS in the RA phase, we calculated that EPA had funded 40 percent. Therefore, we assumed that EPA would fund 40 percent of future/planned RAS. EPA officials understood the basis for this assumption but stated that their goal still remains to have 70 percent of the sites funded by responsible parties. Furthermore, the officials provided statistics indicating that, for sites funded by responsible parties during fiscal years 1996 through 1998, over 70 percent of the remedial designs and remedial actions are being performed by responsible parties.
- Because the same party usually performs both the remedial design and the construction, we assumed EPA would also fund 40 percent of the remedial designs.
- To estimate the cost of the EPA-funded cleanups of OUS in each respective cleanup phase, we multiplied the number of OUS by a range of costs provided by EPA. According to EPA, these cost ranges considered OUS where no action is required and no remediation costs are incurred.

¹⁰In its presentations to the Senate Committee on Environment and Public Works in June 1999, EPA reported that there were 1,261 OUs at 649 nonfederal NPL sites, as of mid-April 1999. EPA officials told us that nine sites have been transferred to other cleanup programs and that 18 OUs were not counted because of errors in coding data. The officials agreed that the figures should be 640 sites and 1,279 OUs.

- For OUS that were ongoing (rather than planned or completed) in each cleanup phase, we assumed the action had already been partially—50 percent—funded and therefore used 50 percent of the respective cost estimate.
- We used site-specific remedial action cost estimates from records of decision (ROD) available for 65 of 116 ongoing EPA-fund cleanups of OUS and added 20 percent for cost growth, as estimated by the Congressional Budget Office (CBO).¹¹
- We estimated the number and cost of removals remaining to be funded at the 640 sites using data from our recent survey of 609 of the 640 sites.¹² We estimated that 100 sites would require removal actions and that EPA would fund these actions at 61 sites. Assuming 3.5 removal actions per site and a cost of \$0.8 million for each removal action, we estimated \$174 million as the total remaining removal cost at the 640 sites.
- In a recent report, we categorized cleanup costs as contractor cleanup costs (about 45.5 percent of the total) and cleanup support costs—site-specific and non-site-specific. Site-specific cleanup support costs are equal to 37.6 percent of contractor cleanup costs. Non-site-specific cleanup support costs are equal to 84.9 percent of contractor cleanup costs. These percentages were used to determine support costs.¹³
- Operation and maintenance (O&M) costs were calculated for all EPA-funded cleanups of OUS that EPA expects will require long-term funding. For example, EPA funds up to 10 years of O&M costs for OUS with remedies designed to restore groundwater or surface water. States then fund the remaining O&M costs for these OUS. EPA predicts that 50 percent of all OUS will have remedies requiring up to 10 years of expenditures for O&M, estimated by EPA to be \$0.5 million per OU annually.
- To estimate annual costs, we used the midpoint for each range of estimates for contractor cleanup, site-specific support, and

¹¹EPA officials told us that a recently completed EPA study, done in conjunction with the U.S. Army Corps of Engineers, projects the cost growth between contract award and contract completion at 16 to 37 percent.

¹²See *Superfund: Half the Sites Have All Cleanup Remedies in Place or Completed* (GAO/RCED-99-245, July 30, 1999).

¹³See *Superfund: EPA Can Improve Its Monitoring of Superfund Expenditures* (GAO/RCED-99-139, May 11, 1999).

non-site-specific support costs and then evenly apportioned 85 percent of these costs over the period from 2000 to 2008, which is the 9-year period needed to complete 85 percent of the cleanups. Thus, about 9.4 percent of the total costs are incurred for each of these 9 years. Because it may take many years to complete cleanups of the remaining 15 percent of OUs, we simply allocated the costs for these sites evenly between 2009 and 2010. Thus, we assigned about 7.7 percent of the total cost to each of these 2 years.

- The annual O&M costs for the 640 sites were estimated by equally distributing the costs for 85 percent of the OUs projected to require federal O&M funding over the years 2000-2008 and evenly distributing the costs for the remaining OUs over 2009 and 2010. Each OU was estimated to cost \$0.5 million annually, and these costs were projected to continue for 10 years.

Estimated Annual Costs to Complete 85 Percent of the 640 NPL Sites, or 1,279 Operable Units, by 2008

Dollars in millions

Annual costs, assuming completion of 85 percent of OUs by 2008

Fiscal year	Percent of total costs	Contractor cleanup costs	Site-specific support costs	Subtotal for cleanup and site-specific support	Non-site-specific support costs	Subtotal for cleanup and support	O&M	Total costs
2000	9.4	\$366.2	\$137.7	\$503.9	\$310.9	\$814.8	\$12.0	\$826.8
2001	9.4	366.2	137.7	503.9	310.9	814.8	24.0	838.8
2002	9.4	366.2	137.7	503.9	310.9	814.8	36.0	850.8
2003	9.4	366.2	137.7	503.9	310.9	814.8	48.0	862.8
2004	9.4	366.2	137.7	503.9	310.9	814.8	60.0	874.8
2005	9.4	366.2	137.7	503.9	310.9	814.8	72.0	886.8
2006	9.4	366.2	137.7	503.9	310.9	814.8	84.0	898.8
2007	9.4	366.2	137.7	503.9	310.9	814.8	96.0	910.8
2008	9.4	366.2	137.7	503.9	310.9	814.8	108.0	922.8
2009	7.7	300.0	112.8	412.7	254.7	667.4	118.0	785.4
2010	7.7	300.0	112.8	412.7	254.7	667.4	116.0	783.4
2011	a	a	a	a	a	a	104.0	104.0
2012	a	a	a	a	a	a	92.0	92.0
2013	a	a	a	a	a	a	80.0	80.0
2014	a	a	a	a	a	a	68.0	68.0
2015	a	a	a	a	a	a	56.0	56.0
2016	a	a	a	a	a	a	44.0	44.0
2017	a	a	a	a	a	a	32.0	32.0
2018	a	a	a	a	a	a	20.0	20.0
2019	a	a	a	a	a	a	10.0	10.0
Total	100	\$3,895.6	\$1,464.7	\$5,360.3	\$3,307.4	\$8,667.7	\$1,280.0	\$9,947.7

Note: Totals may not add because of rounding.

^aCleanups completed except for O&M.

Source: GAO's analysis of estimates by EPA.

Comments From the Environmental Protection Agency



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OCT 21 1999

OFFICE OF
SOLID WASTE AND EMERGENCY
RESPONSE

David G. Wood, Associate Director
Environmental Protection Issues
Resource, Community, and Economic Development Division
U.S. General Accounting Office
Washington D.C. 20548

Dear Mr. Wood:

Thank you for providing us the opportunity to review the draft GAO report, Superfund: Information on the Program's Funding and Status (GAO/RCED-00-25). Because we had two days in which to respond to the report we can only provide you with our major observations at this time.

The draft report has two major shortcomings. First, it seriously understates Superfund program costs and future program needs. Second, the report does not accurately present the status of Superfund program accomplishments.

The draft report neglects to consider the hundreds of millions of dollars required annually to protect communities from threats posed by sites not currently on the National Priorities List (NPL). Through the removal program, the Environmental Protection Agency (EPA) annually responds to approximately 300 emergency or time-critical hazardous substance incidents that pose immediate health risks. Most of these responses are at sites not listed on the NPL. The cost of this critical component of the Superfund program is not addressed in the GAO draft report.

The draft report does not capture the cost of addressing sites that will be placed on the NPL in coming years. When it is necessary to protect human health and the environment, the Agency adds sites to the NPL. In its November 30, 1998, report, Hazardous Waste: Unaddressed Risks at Many Potential Superfund Sites, GAO identified 232 sites that were likely to be listed on the NPL and 1789 sites potentially eligible for the NPL. Although EPA believes that only a minority of these sites will be listed in the future, EPA has listed, and is likely to add, sites to the NPL that GAO did not identify in the 1998 study. States also continue to identify about 500 sites each year to EPA that need site assessment decisions. Between the sites identified by the GAO survey, sites in other stages of the process that were not included in the GAO survey, and newly discovered sites, future listings will be necessary. In fiscal year 1999, EPA added 43 sites to the final NPL. In the first month of this new fiscal year, EPA has added 10 sites and proposed 9

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additional sites to the NPL. These and other future NPL sites were not included in GAO's cost analysis. Addressing these sites and future listings will cost hundreds of millions of dollars annually that are unaccounted for by this report.

The draft report does not account for resources that are transferred to the Office of the Inspector General, the Office of Research and Development, and to other Federal agencies such as the Agency for Toxic Substances and Disease Registry, the Federal Emergency Management Agency, and the National Oceanic and Atmospheric Administration. These parties play a key role carrying out the responsibilities of the Superfund program. Without their support, for example, communities with hazardous wastes in their midst would be left without the benefits of health assessments and EPA, as well as responsible parties, would be hindered from applying innovative remediation technologies to complex hazardous waste problems. We estimate that over a hundred million dollars in transfers to these parties are excluded from GAO's annual allocation of resources to complete cleanup at remaining non-Federal NPL sites.

The draft report mischaracterizes EPA's activities by categorizing EPA expenditures into three groups: contractor cleanup costs, site-specific support costs, and non-site-specific support costs. Because these terms are overly broad, they are poor descriptors of the Superfund program and have extremely limited use in evaluating and managing the program. These headings, as well as use of the generic term "overhead," fail to describe the actual work that takes place to accomplish the cleanups that are the mandate of the Superfund program. For example, the on-site presence of EPA project managers who are responsible for achieving cleanups is relegated to "support," and the research and development of innovative remediation technologies that improve the pace and effectiveness of cleanups are excluded from these categories. Even the contributions of the EPA enforcement program are lost when subsumed under the terms "support" or "overhead." As this GAO report acknowledges, EPA's enforcement program, along with the Department of Justice, is responsible for successfully leveraging over \$15 billion worth of commitments for cleanup and cost recovery from responsible parties. To characterize these costs as "support" dismisses the contribution that these resources play in obtaining private party commitments for cleanup and cost recovery, costs that would be otherwise borne by the Fund in the absence of the enforcement program.

In several areas, the draft report inaccurately characterizes as PRP expenditures \$13 billion that actually represents responsible party commitments for future cleanup work. Some of these resources have yet to be expended, and in some cases will be expended over a 30 year period. In particular, in calculating the expected PRP transaction costs before and after expiration of the Superfund tax, GAO mistakenly assumes that \$11.1 billion of the \$13 billion was expended prior to expiration of the tax. In fact, the \$11.1 billion represents private party commitments received prior to the expiration of the tax, not expenditures. As a result, some expenditures associated with the \$11.1 billion in PRP commitments have not yet occurred, and thus the transaction costs associated with those expenditures are likely to be incurred, or have been incurred, after the tax expired. Because the report analyzes transaction costs as a percentage of expenditures as opposed to PRP commitments for cleanup, the results presented in

**Appendix IV
Comments From the Environmental
Protection Agency**

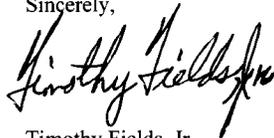
Table 5 are misleading. In addition, the analysis does not take into account the potential reductions in transaction costs that may result from the Superfund Administrative Reforms implemented in the enforcement program. We recommend that this section be modified to correct these problems.

The draft report allocates 85% of the future Superfund costs across a 9-year period. This assumption is unrealistic. Such a distribution, based on the rate of construction completions, misses the fact that, to achieve construction completions, remedial actions must first start. Without receiving full funding for the program, EPA's ability to initiate work is seriously affected -- which, in turn, jeopardizes our ability to achieve our goal of 1,180 construction completions by 2005. Should Congress base its appropriations to Superfund using this rationale, the current pace of cleanup could not be maintained.

The draft report also seriously misrepresents EPA's progress in cleaning up Superfund sites to date. While EPA clearly has more cleanups to perform, and needs the full complement of resources to achieve these cleanups, GAO's description of Superfund progress needlessly takes a "glass-half-empty approach" that fails to provide a balance between the work remaining to be done and the work completed. For example, GAO's opening statement that about 42% of the 1400 NPL sites have "cleanup strategies designed and in place" is incorrect. As of mid-April 1999, 90% of all final and deleted NPL sites (1386) were either undergoing cleanup construction (remedial or removal) or had construction completed. In addition, the information presented by GAO primarily describes site status based on the progress of the least advanced operable unit. These data do not fully reflect the progress that EPA has made at these sites. For example, as of mid-April 1999, EPA selected remedies for 72% of the remaining 1279 operable units at these 640 sites, and remedies were under construction at 41% of the operable units at these sites. Finally, as of the end of fiscal year 1999, EPA completed construction at 670 sites, which is close to 55% of the non-Federal facility sites on the final and deleted NPL as of 1998. These data demonstrate that EPA has made significant strides to complete work at current NPL sites.

Please contact me if you require additional information.

Sincerely,



Timothy Fields, Jr.
Assistant Administrator

Scope and Methodology

To determine the taxes paid into the Superfund trust fund, we obtained data from EPA on Superfund taxes, by year, for fiscal years 1981 through 1998. For the estimated balance for the Superfund trust fund at the end of fiscal year 1999, we obtained an income data statement from the Department of the Treasury, which was current as of July 31, 1999. For deobligated Superfund amounts, we obtained data from EPA on these amounts for fiscal years 1994 through July 1999. Using the monthly averages for fiscal year 1999 deobligations, we projected deobligations for the remaining months of the fiscal year to arrive at an estimated total through fiscal year 1999. For Superfund expenditure information, we obtained annual expenditure data from EPA for fiscal years 1996 through 1998 and allocated the expenditures among three categories presented in our May 1999 report.¹⁴ For program funds appropriated to other federal agencies, EPA provided us with Superfund appropriation data for fiscal years 1995 through 1998.

To provide information on the costs to responsible parties for site cleanups and related transaction costs, we obtained EPA's estimates of these parties' cleanup costs, which were based on the value of the cleanup work stated in RODS and standard cost assumptions. In addition, EPA provided data from settlement agreements with responsible parties for past cleanup work performed by EPA. These costs were summed and categorized for the periods before and after the authority for Superfund taxes expired in December 1995. To determine the cleanup transaction costs incurred by responsible parties, we obtained estimates of these costs from CBO, RAND, and our studies of transaction costs. Using each estimate as a percentage of cleanup costs, we calculated transaction cost estimates.

To obtain information on the cleanup status of the 640 nonfederal sites on the NPL that were not construction complete as of mid-April 1999, we obtained data from EPA on the cleanup status of the operable units at the sites. The 640 sites contained 1,279 operable units. Each site consists of one or more operable units, and we classified a site's overall progress by the operable unit in the least advanced stage of the Superfund process. For example, we classified a site with three operable units—one in the remedial design phase and two in the remedial investigation/feasibility study phase—as in the remedial investigation/feasibility study phase. We also classified each site's progress by the operable unit in the most advanced phase of the Superfund cleanup process.

¹⁴Superfund: EPA Can Improve Its Monitoring of Superfund Expenditures (GAO/RCED-99-139, May 11, 1999).

To determine the estimated completion dates for Superfund sites, we used two information sources. First, we used the site-specific completion estimates that we collected from EPA's site managers for our recent review of the status of cleanups at NPL sites.¹⁵ Second, when such an estimate was not available, we calculated the estimated completion date using EPA's standard completion time for each phase in the Superfund process—3.1 years for the remedial investigation/feasibility study, 2.8 years for the remedial design, and 2.1 years for remedial action, for a total of 8 years once a site is on the NPL.

To obtain information on the costs to clean up the 640 sites, we obtained ranges of cost estimates from EPA for completing each phase of the remedial action process. We used these cost ranges to calculate an overall cleanup cost, and we estimated remaining removal costs at the 640 sites using EPA's estimates of removal costs and removals already conducted at these sites. To determine overhead costs, we calculated overhead rates for site-specific overhead and non-site-specific overhead costs. We derived these rates from EPA's Superfund expenditure data for fiscal years 1996 through 1998, as we reported in May 1999.¹⁶ We applied these overhead rates to the total cost of remedial and removal actions to derive the total site-specific and non-site-specific overhead amounts. To determine the annual cleanup costs, we allocated costs by year according to the year of estimated completion.

¹⁵See Superfund: Half the Sites Have All Cleanup Remedies in Place or Completed (GAO/RCED-99-245, July 30, 1999).

¹⁶Superfund: EPA Can Improve Its Monitoring of Superfund Expenditures (GAO/RCED-99-139, May 11, 1999).

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